MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2015/2016

PPS0025 – INTRODUCTION TO PROBABILITY AND STATISTICS

(Foundation in Business)

2 JUNE 2016
9.00 a.m. – 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of FOUR **printed** pages including cover page.
2. Attempt **ALL** FOUR questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please write all your answers in the answer booklet provided. All necessary working steps **MUST** be shown.
4. **Statistical table** is provided.

Question 1 (25 marks)

a. Let X denotes the number of travel magazines selected by the student. The following table given is the probability distribution table of X.

x	0	1	2	3	4	5	6
$P(X=x)$	k	k	$2k$	$3k$	0.15	k	0.05

i. Find the value of constant k. (2 marks)
ii. Calculate $P(X<4)$. (1 marks)
iii. Find the expected value of X. (2 marks)
iv. Find the variance of X. (4 marks)

b. Given the following probability density function of a random variable $\boldsymbol{X}$,

$$f(x)=\begin{cases} m(x^2-x) & , \quad 0<x<3 \\ 0 & , \quad otherwise \end{cases}$$

i. Show that $m=\frac{2}{9}$. (5 marks)

ii. Find the mean of X. (5 marks)

iii. Find the standard deviation of X. (6 marks)

Question 2 (25 marks)

a. Based on a survey conducted, 76% of the students from Foundation in Management managed to register their course online. A random sample of 20 students from Foundation in Management is selected. Find the probability that

i. at least 11 students managed to register their course online. (3 marks)
ii. exactly 14 students managed to register their course online. (3 marks)
iii. 5 to 8 students failed to register their course online. (3 marks)

Continued ...

b. On average, there are 2.8 work related injuries per month in a manufacturing plant.

i. Find the probability that less than eight work related injuries occur in a given month. (2 marks)

ii. Find the probability that no work related injuries occur in 4 months. (2 marks)

iii. Find the probability that between 13 and 22 work related injuries occur in 165 days. (Assume that 1 month = 30 days) (4 marks)

c. The length of caterpillar is normally distributed with a mean of 55mm and a standard deviation of 6mm.

i. Find the probability that the length of caterpillar will be at most 65mm. (2 marks)

ii. What is the length of caterpillar that would be in the middle 70% of the length? (6 marks)

Question 3 (25 marks)

a. The EQ scores of all 5 students in a small class are as below:

253 248 267 259 234

Construct a sampling distribution of sample mean with samples of size two, which can be selected without replacement from this population. Then, find the sampling error for each sample.

(15 marks)

b. The mean weight of a Statistics textbook is found to be 2.58kg with a standard deviation of 1.2kg. Find the probability that the mean weight of a random sample of 35 such textbooks

i. is between 2.14kg and 3.11kg. (5 marks)

ii. is less than the population mean by 0.34kg. (5 marks)

Continued ...

Question 4 (25 marks)

a. You are the manager of a fast-food restaurant. You want to determine whether the waiting time to place an order has changed in the past month from its previous population mean value of 4.8 minutes. From past experience, you can assume that the population is normally distributed with a population standard deviation of 1.2 minutes. You have selected a sample of 40 orders during lunch hour period and found that the sample mean is 5.1 minutes. What is the decision at a 5% significance level? (9 marks)

b. A company that manufactures chocolate bars is particularly concerned that the mean weight of a chocolate bar is greater than 6.04 ounces. A sample of 60 chocolate bars is selected, and the sample mean is 6.046 ounces and the sample standard deviation is 0.03 ounces. What is the decision at the 0.1 level of significance?

(8 marks)

c. According to a study, households that own one cat spend an average of $156 per year on veterinary care. Assume that this average is based on a random sample of 900 such cat owners and that the sample standard deviation is $48.

i. What is the point estimate of the mean annual expenditure on veterinary care for all such cat owners? What is the margin of error for this estimate? (3 marks)

ii. Make a 94% confidence interval for the mean annual expenditure on veterinary care for all such cat owners. (5 marks)

End of Page